CHAPTER I

INTRODUCTION

A. Background

Concrete is a material consisting of cement, sand and water with the addition of a kind of aggregate, such as asphalt. Concrete is one of the most important building materials in the modern era, especially with iron reinforcement to become reinforced concrete.

And It is a type of high performance concrete generally with a specified compressive strength of 6,000 psi (40MPa) or greater. The compressive strength is measured on 6˝ 12 inch (150˝ 300 mm) or 4˝ 8 inch (100’ 200 mm) test cylinders generally at 28 days or some other specified age depending upon the application. The production of high strength concrete requires more research and more attention to quality control.

Concrete has many characteristics that distinguish it from other materials. It takes a solid and time-resistant form gradually, beginning with the initial doubt and ending with the final doubt. It is also very resistant to stress due to pressure but at the same time very weak in its resistance to tensile, so ordinary (unarmed) concrete is never used in places where tensile stresses (such as beams).

Than conventional concrete. Many discoveries about the concrete starting from 1824, a scientist who discovered Portland cement named Aspdin, then by JL.LAMBOT in 1850 introduced the basic concepts of composite construction (combined two different construction materials that work together – carry the load), in 1861 F. coignet tested the use of iron distribution in roof construction, pipe and dome, in 1887 Gustav ways, Koenen and Hennibequ introduce stirrups as anchoring the shear force and the use of beam T to reduce the burden of its own weight, and still a lot of research that utilizes other concrete.

The reason is improve the quality and of high strength concrete. Otherwise, the fly ash improves concrete’s ultimate strength, as well as solves many problems experienced with concrete today and all for less coast. And other benefit it could be

also to reduced permeability to water and aggressive chemicals. It could be also use to give a good environmental with a less pollution either use the other material that have a fast fire.

A versatile material, high-strength concrete (HSC) possesses desirable properties other than high strength. The most dramatic and memorable applications stem from this aspect, however, as high-rise buildings like 311 South Wacker Drive create striking visual impressions. This structure, at 969 ft (295 m), was the world's tallest concrete building when completed in 1989, utilizing concrete with compressive strengths of up to 12,000 psi (83 MPa). HSC is specified where reduced weight is important or where architectural considerations require smaller load-carrying elements. In high-rise buildings, HSC helps to achieve more efficient floor plans through smaller vertical members and has also often proven to be the most economical alternative by reducing both the total volume of concrete and the amount of steel required for a load-bearing member. Also, formwork is a large portion of the cost of constructing a column; smaller column sizes reduce the amount of formwork needed and result in further cost savings. Based on the above, this study aims to determine the compressive strength of high strength concrete where aged 28 day to add fly ash materials PT varia usaha, and how the influence of fly ash to concrete compared with normal concrete (0% fly ash).

B. Benefits of study

In this research I try to explain the use of fly ash in concrete as an alternative to cement increases the strength of concrete by 15 percent, adding 8 to 12 percent of fly ash to concrete achieves the best engineering properties in the final product.

C. Problem formulation

Research on high strength concrete with age 28 today taken the formulation of the problem as follows: How the concrete compressive strength of high quality age of 28

day with a variety of mix 0%, 5%, 10%, 15% and 20% additive fly ash varia usaha? And which variation of them can get that highest compressive strength?

D. Objectives of research

The objective of this research are providing better concrete than traditional concrete in terms of performance aspects. The idea of this research is to replace a fraction of cement with fly ash at different rates, to find the best engineering properties of concrete in terms of pressure.

E. Limitations

To anticipate the discussion occurs outside the problem, therefore, is defined the Problem as follows:

a. The cement used is Portland cement brands Gresik (PPC).
b. Coarse aggregate derived from panca darma , Solo.
c. Fine aggregates derived from Muntilan, Sleman, Yogyakarta.
d. Fly ash from PT varia usaha , solo, central Java.
e. Water used from the civil engineering laboratory UMS.
f. Quality concrete is planned f'c = 40 MPa method mix design using ACI (America concrete institute).
g. Testing fresh concrete is done with the slump test.
h. Fly ash as an admixture to replace the 0%, 5%, 10%, 15% and 20% by weight of cement
i. Water/ cement ratio of 0.3
j. Compressive strength with a cylindrical specimen with a diameter of 15 cm and 30 cm high and concrete testing at the age of 28 day.

F. Authenticity research

1. The research

Research field with the title “the effects of fly ash class F to get high strength concrete” discussed on the use of variation fly ash as many 0%, 5%, 10%, 15% and 20% of the cement weight.

2. Previous research

To research away from the use of fly ash which has the quality of high strength concrete, by using dust as substitute for fine aggregate, obtained strong press at the age of 28 days to variation 12.5% PT varia usaha fly ash of the weight of a cement of 43.03 MPa has increased 43.38 % than normal concrete.